

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: COPPENS et al.
Appln No.: 08/898,736
Filed: July 23, 1997
For: PROCESS FOR THE
PREPARATION OF MALTED
CEREALS
Group Art
Unit: 1761
Examiner: Curtis E. Sherrer

RESPONSE TO NOTIFICATION OF NON-COMPLIANCE WITH 37 CFR 1.192(c)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the "Notice of Non-Compliance with 37 CFR 1.192(c)" dated July 9, 2004, we enclose an amended version of Appendix A in triplicate. The corrected Appendix A provided herewith (without refiling the brief to which it is attached) has been revised as suggested by the Supervisory Primary Examiner Cano to correct inadvertent errors in claim dependencies (in lieu of a formal Amendment under Rule 1.116). Specifically, Appendix A provided herewith has been revised to make claim 33 depend from claim 31, to make claim 45 depend from claim 28, and to correct the dependency in claim 59. If required, the Examiners are authorized and requested to do an Examiner's Amendment to make the claims comport with the attached Appendix A.

The actions taken herein are per a telephone discussion with the SPE Cano on July 19, 2004. Applicants respectfully request that the revised Appendix A submitted herewith replace Appendix A as filed with the Appeal Brief which was filed on April 6, 2004.

The Commissioner is hereby authorized to charge any additional required fees to deposit account No. 06-1135.

Respectfully submitted,

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APPENDIX A

Pending Claims

1. A process for the preparation of a malted cereal comprising: introducing activated spores in an amount of about 1×10^2 to about 1×10^7 per gram of dry cereal to a cereal before or during a malting process, the activated spores being present on the cereal in an amount which is effective for providing the malted cereal with an increased enzyme activity, the increased enzyme activity being greater than the enzyme activity which is obtained by the same malting process but with dormant spores.

3. The process according to Claim 1, wherein said enzyme is selected from the group of B-glucanase, xylanase, amylase, a protease, naturally occurring enzymes in the cereal and combinations thereof.

4. A process for the preparation of a malted cereal as recited in claim 43 wherein the cereal, water and activated spores are combined to form a combination and where the concentration of the activated spores and the combination is held together for a time and temperature which are effective for providing the malted cereal with an enzyme activity which is greater than the enzyme activity which is obtained by a malting process without activated spores.

5. A process as recited in claim 4 wherein the combination is held for a time and temperature until the cereal has a moisture content of at least about 20 weight percent.

6. A process as recited in claims 4 or 5 wherein the combination is held until the cereal germinates and after germination, cereal is dried to a moisture content of not more than about 15 weight percent.

7. A process as recited in claim 3 wherein the process further comprises drying the combination and prior to the drying, the combination is held until the cereal has a moisture content of between about 20 to about 60 weight percent and the cereal has germinated for about 2

to about 7 days at a temperature of from about 10 to about 30°C.

8. A process as recited in claim 6 wherein the process further comprises drying the combination and prior to drying, the combination is held until the cereal has a moisture content of between about 20 to about 60 weight percent and the cereal has germinated for about 2 to about 7 days at a temperature of from about 10 to about 30°C.; and

after the germination, the combination is dried to a moisture content of from about 2 to about 15 weight percent.

9. A process as recited in claim 1 or 4 wherein the activated spores are from microbes selected from the group comprising of *Micrococcus* spp., *Streptococcus* spp., *Leuconostoc* spp., *Pediococcus* spp., *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus soyae*, *Lactococcus* spp., *Lactobacillus* spp., *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bif fermentans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus reuteri*, *Lactobacillus sake*, *Lactobacillus sativarius*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus confusus*, *Lactobacillus florentinus*, *Lactobacillus viridescens*, *Corynebacterium* spp., *Propionibacterium* spp., *Bifidobacterium* spp., *Streptomyces* spp., *Bacillus* spp., *Sporofactobacillus* spp., *Acetobacter* spp., *Agrobacterium* spp., *Alcaligenes* spp., *Pseudomonas* spp., *Pseudomonas amylophilus*, *Pseudomonas aeruginosa*, *Pseudomonas cocovenenans*, *Pseudomonas mexicana*, *Pseudomonas pseudomallei*, *Gluconobacter* spp., *Enterobacter* spp., *Erwinia* spp., *Klebsiella* spp., *Proteus* spp., *Ascomycota*, *Dothideales*, *Mycosphaerellaceae*, *Mycosphaerella* spp., *Venturiaceae*, *Venturia* spp., *Eurotiales*, *Monascaceae*, *Monascus* spp., *Trichocomaceae*, *Emericella* spp., *Duroteum* spp., *Eupenicillium* spp., *Neosartorya* spp., *Talaromyces* spp., *Hypocreales*, *Hypocreaceae*, *Hypocrea* spp., *Saccharomycetales*, *Dipodascaceae*, *Dipodascus* spp., *Galactomyces* spp., *Endomycetaceae*, *Endomyces* spp., *Metschnikowiaceae*, *Guilliermondella* spp., *Saccharomycetaceae*

Debaryomyces spp., *Dekkera* spp., *Pichia* spp., *Kluyveromyces* spp., *Saccharomyces* spp.,
Torulaspora spp., *Zygosaccharomyces* spp., *Saccharomycodaceae*, *Hanseniaspora* spp.,
Schizosaccharomycetales, *Schizosacchromycetaceae*, *Schizosaccharomyces* spp., *Sordariales*,
Chaetomiaceae, *Chaetomium* spp., *Sordariaceae*, *Neurospora* spp., *Zygomycota*, *Mucorales*,
Mucoraceae, *Absidia* spp., *Amylomyces* spp., *Rhizomucor* spp., *Actinomucor* spp.,
Thermomucor spp., *Chlamydomucor* spp., *Mucor* spp., *Mucor circinelloides*, *Mucor grisecyanus*,
Mucor hiemalis, *Mucor indicus*, *Mucor mucedo*, *Mucor piriformis*, *Mucor plumbeus*, *Mucor*
praini, *Mucor pusillus*, *Mucor silvaticus*, *Mucor javanicus*, *Mucor racemosus*, *Mucor rouxianus*,
Mucor rouxii, *Mucor aromatiacus*, *Mucor flavus*, *Mucor miehei*, *Rhizopus* spp., *Rhizopus*
arrhizus, *Rhizopus oligosporus*, *Rhizopus oryzae*, strains ATCC 4858, ATCC 9363, NRRL 1891,
NRRL 1472, *Rhizopus stolonifer*, *Rhizopus thailandensis*, *Rhizopus formosensis*, *Rhizopus*
chinensis, *Rhizopus cohnii*, *Rhizopus japonicus*, *Rhizopus nodosus*, *Rhizopus delemar*, *Rhizopus*
acetorinus, *Rhizopus chlamydosporus*, *Rhizopus circinans*, *Rhizopus javanicus*, *Rhizopus peka*,
Rhizopus salto, *Rhizopus tritii*, *Rhizopus niveus*, *Rhizopus microsporus*, *Mitosporic* fungi
preferentially *Aureobasidium* spp., *Acremonium* spp., *Cercospora* spp., *Epicoccum* spp., *Monilia*
spp., *Monilia candida*, *Monilia sitophila*, *Mycoderma* spp., *Candida* spp., *Candida diddensiae*,
Candida edax, *Candida etchellsii*, *Candida kefir*, *Candida krusei*, *Candida lactosa*, *Candida*
lambica, *Candida mellinii*, *Candida utilis*, *Candida milleri*, *Candida mycoderma*, *Candida*
parapsilosis, *Candida obtusa*, *Candida tropicalis*, *Candida valida*, *Candida versatilis*, *Candida*
guilliermondii, *Rhodotorula* spp., *Torulopsis* spp., *Geotrichum* spp., *Geotrichum amycelium*,
Geotrichum armillariae, *Geotrichum asteroides*, *Geotrichum bipunctatum*, *Geotrichum dulcitum*,
Geotrichum eriensae, *Geotrichum fici*, *Geotrichum flavo-brunneum*, *Geotrichum fragrans*,
Geotrichum gracile, *Geotrichum heritii*, *Geotrichum kiebickii*, *Geotrichum penicillatum*,
Geotrichum hirtum, *Geotrichum pseudocandidum*, *Geotrichum rectangulatum*, *Geotrichum*
suaveolens, *Geotrichum vanrylei*, *Geotrichum loubieri*, *Geotrichum microsporum*, *Cladosporium*
spp., *Trichoderma* spp., *Trichoderma hamatum*, *Trichoderma harzianum*, *Trichoderma koningii*,
Trichoderma pseudokoningii, *Trichoderma reesei*, *Trichoderma virgatum*, *Trichoderma viride*,
Oidium spp., *Alternaria* spp., *Alternaria alternata*, *Alternaria tenuis*, *Helminthosporium* spp.,
Helminthosporium gramineum, *Helminthosporium sativum*, *Helminthosporium teres*,
Aspergillus spp., *Aspergillus ochraceus* Group, *Aspergillus nidulans* Group, *Aspergillus*

● versicolor Group, Aspergillus wentii Group, Aspergillus candidus Group, Aspergillus flavus Group, Aspergillus niger Group, Penicillium sap., Penicillium aculeatum, Penicillium citrinum, Penicillium claviforme, Penicillium funiculosum, Penicillium italicum, Penicillium lanoso-viride, Penicillium emersonii, Penicillium lilacinum, Penicillium expansum and mixtures thereof.

13. A process for the preparation of a malted cereal said process comprising:

(a) introducing activated spores in an amount of from about 1×10^2 to about 1×10^7 per gram of dry cereal into a moistened cereal to form a moistened cereal/activated spore combination;

(b) germinating the cereal in the moistened cereal/activated spore combination to provide a germinated cereal, the activated spores being present in the cereal in an amount which is effective for providing the germinated cereal with an increased enzyme activity, the increased enzyme activity being greater than the enzyme activity which is obtained by the same malting process but with dormant spores; and

(c) drying said germinated cereal.

14. The process according to claim 13, wherein said moistened cereal/activated spore combination is held at a temperature of from about 5° to about 30°C until the cereal has a moisture content of from about 20 to about 60 weight percent moisture.

15. The process according to claim 13 or claim 14, wherein the moistened cereal/activated spore combination is held for about 3 to about 6 days at a temperature of from about 10° to about 30°C .

16. The process according to Claim 13 or 14, wherein said germinated cereal is dried to a moisture content of from about 2 to about 15 weight percent

17. A process as recited in claim 13 wherein the combination is held at a temperature of from about 10°C to about 20°C until the cereal has a moisture content of from about 38 to about 47 weight percent and the cereal has germinated for about 3 to about 6 days at a temperature of

from about 14°C to about 18°C and the germinated cereal is dried at a temperature of from about 40°C to about 150°C.

18. A process for the preparation of a malted cereal said process comprising: mixing water, a cereal and activated spores to provide a moistened cereal/activated spore combination, the activated spores in an amount of from about 1×10^2 to about 1×10^7 per gram of dry cereal, and holding moistened cereal/activated spore combination for a time and at a temperature, the amount of the activated spores, holding time and holding temperature effective for providing the malted cereal with an increased activity of an enzyme compared to the activity of an enzyme obtained by moistening and mixing the cereal with dormant spores.

19. The process according to Claim 18, wherein said enzyme is selected from the group of B-glucanase, xylanase, amylase, a protease, naturally occurring enzymes in the cereal and combinations thereof.

20. A process as recited in claim 18, wherein the holding time and holding temperature are effective to provide the cereal with a moisture content of at least about 20 weight percent.

21. A process as recited in claim 20 wherein after cereal attains a moisture content of at least about 20 weight percent, it is dried to a moisture content of not more than about 15 weight percent.

22. A process as recited in claims 18, 19, 20, or 21, wherein the holding time and holding temperature are effective to provide the cereal with a moisture content of between about 20 to about 60 weight percent and wherein the cereal has germinated for about 2 to about 7 days at a temperature of from about 20 to about 30°C.

23. A process as recited in claim 22, wherein the germinated cereal is dried to a moisture content of from about 2 to about 15 weight percent.

24. A process as recited in claim 23 wherein the activated spores are from the microbes selected from the group comprising *Micrococcus* spp., *Streptococcus* spp., *Leuconostoc* spp., *Pediococcus* spp., *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus soyae*, *Lactococcus* spp., *Lactobacillus* spp., *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bifermentans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus reuteri*, *Lactobacillus sake*, *Lactobacillus sativarius*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus confusus*, *Lactobacillus florentinus*, *Lactobacillus viridescens*, *Corynebacterium* spp., *Propionibacterium* spp., *Bifidobacterium* spp., *Streptomyces* spp., *Bacillus* spp., *Sporofactobacillus* spp., *Acetobacter* spp., *Agrobacterium* spp., *Alcaligenes* spp., *Pseudomonas* spp., *Pseudomonas amylophilus*, *Pseudomonas aeruginosa*, *Pseudomonas cocovenenans*, *Pseudomonas mexicana*, *Pseudomonas pseudomallei*, *Gluconobacter* spp., *Enterobacter* spp., *Erwinia* spp., *Klebsiella* spp., *Proteus* spp., Ascomycota, Dothideales, *Mycosphaerellaceae*, *Mycosphaerella* spp., *Venturiaceae*, *Venturia* spp., Eurotiales, *Monascaceae*, *Monascus* spp., *Trichocomaceae*, *Emericella* spp., *Duroteum* spp., *Eupenicillium* spp., *Neosartorya* spp., *Talaromyces* spp., Hypocreales, *Hypocreaceae*, *Hypocrea* spp., *Saccharomycetales*, *Dipodascaceae*, *Dipodascus* spp., *Galactomyces* spp., *Endomycetaceae*, *Endomyces* spp., *Metschnikowiaceae*, *Guilliermondella* spp., *Saccharomycetaceae*, *Debaryomyces* spp., *Dekkera* spp., *Pichia* spp., *Kluyveromyces* spp., *Saccharomyces* spp., *Torulaspora* spp., *Zygosaccharomyces* spp., *Saccharomycodaceae*, *Hanseniaspora* spp., *Schizosaccharomycetales*, *Schizosaccharomycetaceae*, *Schizosaccharomyces* spp., Sordariales, *Chaetomiaceae*, *Chaetomium* spp., *Sordariaceae*, *Neurospora* spp., Zygomycota, Mucorales, *Mucoraceae*, *Absidia* spp., *Amylomyces* spp., *Rhizomucor* spp., *Actinomucor* spp., *Thermomucor* spp., *Chlamydomucor* spp., *Mucor* spp., *Mucor circinelloides*, *Mucor grisecyanus*, *Mucor hiemalis*, *Mucor indicus*, *Mucor mucedo*, *Mucor piriformis*, *Mucor plumbeus*, *Mucor praini*, *Mucor pusillus*, *Mucor silvaticus*, *Mucor javanicus*, *Mucor racemosus*, *Mucor rouxianus*, *Mucor rouxii*, *Mucor aromatiacus*, *Mucor flavus*, *Mucor miehei*, *Rhizopus* spp., *Rhizopus*

arrhizus, *Rhizopus oligosporus*, *Rhizopus oryzae*, strains ATCC 4858, ATCC 9363, NRRL 1891, NRRL 1472, *Rhizopus stolonifer*, *Rhizopus thailandensis*, *Rhizopus formosaensis*, *Rhizopus chinensis*, *Rhizopus cohnii*, *Rhizopus japonicus*, *Rhizopus nodosus*, *Rhizopus delemar*, *Rhizopus acetorinus*, *Rhizopus chlamydosporus*, *Rhizopus circinans*, *Rhizopus javanicus*, *Rhizopus peka*, *Rhizopus salto*, *Rhizopus tritiei*, *Rhizopus niveus*, *Rhizopus microsporus*, *Mitosporic fungi* preferentially *Aureobasidium* spp., *Acremonium* spp., *Cercospora* sap., *Epicoccum* sap., *Monilla* sap., *Monilla candida*, *Monilla sitophila*, *Mycoderma* sap., *Candida* sap., *Candida diddensiae*, *Candida edax*, *Candida etchellii*, *Candida kefir*, *Candida krisei*, *Candida lactosa*, *Candida lambica*, *Candida mellinii*, *Candida utilis*, *Candida milleri*, *Candida mycoderma*, *Candida parapsilosis*, *Candida obtusa*, *Candida tropicalis*, *Candida valida*, *Candida versatilis*, *Candida guilliermondii*, *Rhodotorula* sap., *Torulopsis* sap., *Geotrichum* sap., *Geotrichum amycelium*, *Geotrichum armillariae*, *Geotrichum asteroides*, *Geotrichum bipunctatum*, *Geotrichum dulcitum*, *Geotrichum eriense*, *Geotrichum fici*, *Geotrichum flavo-brunneum*, *Geotrichum fragrans*, *Geotrichum gracile*, *Geotrichum heritum*, *Geotrichum kiebakhii*, *Geotrichum penicillatum*, *Geotrichum hirtum*, *Geotrichum pseudocandidum*, *Geotrichum rectangulatum*, *Geotrichum suaveolens*, *Geotrichum vanrylae*, *Geotrichum loubieri*, *Geotrichum microsporum*, *Cladosporium* sap., *Trichoderma* sap., *Trichoderma hamatum*, *Trichoderma harzianum*, *Trichoderma koningii*, *Trichoderma pseudokoningii*, *Trichoderma reesei*, *Trichoderma virgatum*, *Trichoderma viride*, *Oidium* sap., *Alternaria* sap., *Alternaria alternata*, *Alternaria tenuis*, *Helminthosporium* sap., *Helminthosporium gramineum*, *Helminthosporium sativum*, *Helminthosporium teres*, *Aspergillus* sap., *Aspergillus ochraceus* Group, *Aspergillus nidulans* Group, *Aspergillus versicolor* Group, *Aspergillus wentii* Group, *Aspergillus candidus* Group, *Aspergillus flavus* Group, *Aspergillus niger* Group, *Penicillium* sap., *Penicillium aculeatum*, *Penicillium citrinum*, *Penicillium claviforme*, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium lanoso-viride*, *Penicillium emersonii*, *Penicillium lilacinum*, *Penicillium expansum* and mixtures thereof.

27. A process for the preparation of malted cereal comprising:

steeping the cereal, the steeping including one or more wetting stages at a temperature between about 5° to about 30°C, the wetting stages effective for providing a material having a moisture content between about 20% and about 60% by weight;

germinating the cereal in the presence of activated spores for about 2 to about 7 days at a temperature between about 10° to about 30°C, to provide a germinated cereal,

the activated spores being from microbes selected from the group consisting of bacteria, fungi, and mixtures thereof and being added to the cereal prior to or during the steeping or the germinating of the cereal, the activated spores being present in an amount of from about 1×10^2 to about 1×10^7 per gram of dry cereal and being present in the cereal in an amount which is effective for providing the germinated cereal with an increased enzyme activity, the increased enzyme activity being greater than the enzyme activity which is obtained by the same malting process but with dormant spores;

drying the steeped and germinated cereal at a temperature of from about 40° to about 150°C until the steeped and germinated cereal has a moisture content between about 2% to about 15% by weight.

28. A process according to claim 27, wherein the cereal is barley and, wherein the bacteria are selected from the group comprising *Micrococcus* spp., *Streptococcus* spp., *Leuconostoc* spp., *Pediococcus* spp. preferentially *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus* spp. preferentially *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus parvulus*, *Pediococcus soya*, *Lactococcus* spp., *Lactobacillus* spp. preferentially *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bifementans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus reuteri*, *Lactobacillus sake*, *Lactobacillus sativarius*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus confusus*, *Lactobacillus florentinus*, *Lactobacillus viridescens*,

● *Corynebacterium* spp., *Propionibacterium* spp., *Bifidobacterium* spp., *Streptomyces* spp.,
Bacillus spp., *Sporofactobacillus* spp., *Acetobacter* spp., *Agrobacterium* spp., *Alcaligenes* spp.,
Pseudomonas spp. preferentially *Pseudomonas amylophilica*, *Pseudomonas seruginosa*,
Pseudomonas cocovenenans, *Pseudomonas mexicana*, *Pseudomonas pseudomallei*
Gluconobacter spp., *Enterobacter* spp., *Erwinia* spp., *Klebsiella* spp., and *Proteus* spp.

29. The process according to claim 27, wherein the cereal is barley and wherein the fungi are selected from the group consisting of Ascomycota, Dothideales, Mycosphaerellaceae, Mycosphaerella spp., Venturiaceae, Venturia spp.; Eurotiales, Monascaceae, Monascus spp., Trichocomaceae, Emericella spp., Duroteum spp., Eupenicillium spp., Neosartorya spp., Talaromyces spp., Hypocreales, Hypocreaceae, Hypocrea spp. Saccharomycetales, Dipodascaceae, Dipodascus spp., Galactomyces spp., Endomycetaceae, Endomyces spp., Metschnikowiaceae, Guilliermondella spp., Saccharomycetaceae Debaryomyces spp., Dekkera spp., Pichia spp., Kluyveromyces spp., Saccharomyces spp., Torulaspora spp., Zygosaccharomyces spp., Saccharomycodaceae, Hanseniaspora spp., Schizosaccharomycetales, Schizosaccharomycetaceae, Schizosaccharomyces spp., Sordariales, Chaetomiaceae, Chaetomium spp., Sordariaceae, Neurospora spp., Zygomycota, Mucorales, Mucoraceae, Absidia spp., Amylomyces spp., Rhizomucor spp., Actinomucor spp., Thermomucor spp., Chlamydomucor spp., Mucor spp., Mucor circinelloides, Mucor grisecyanus, Mucor hiemalis, Mucor indicus, Mucor mucedo, Mucor piriformis, Mucor plumbeus, Mucor praini, Mucor pusillus, Mucor silvaticus, Mucor javanicus, Mucor racemosus, Mucor rouxianus, Mucor rouxii, Mucor aromatiacus, Mucor flavus, Mucor miehei, Rhizopus spp., Rhizopus arrhizus, Rhizopus oligosporus, Rhizopus oryzae, strains ATCC 4858, ATCC 9363, NRRL 1891, NRRL 1472, Rhizopus stolonifer, Rhizopus thailandensis, Rhizopus formosensis, Rhizopus chinensis, Rhizopus cohnii, Rhizopus japonicus, Rhizopus nodosus, Rhizopus delemar, Rhizopus acetorinus, Rhizopus chlamydosporus, Rhizopus circinans, Rhizopus javanicus, Rhizopus peka, Rhizopus salto, Rhizopus tritiei, Rhizopus niveus, Rhizopus microsporus, Mitosporic fungi preferentially Aureobasidium spp., Acremonium spp., Cercospora spp., Epicoccum spp., Monilia spp., Monilia candida, Monilia sitophila, Mycoderma spp., Candida spp., Candida diddensiae, Candida utilis, Candida etchellsii, Candida kefir, Candida krusei, Candida lactosa, Candida lambica, Candida mellinii, Candida

● *utilis*, *Candida milleri*, *Candida mycoderma*, *Candida parapsilosis*, *Candida obtux*, *Candida tropicalis*, *Candida valida*, *Candida versatilis*, *Candida guilliermondii*, *Rhodotorula* sp., *Torulopsis* sp., *Geotrichum* sp., *Geotrichum amycelium*, *Geotrichum armillariae*, *Geotrichum asteroides*, *Geotrichum bipunctatum*, *Geotrichum dulcitum*, *Geotrichum ericense*, *Geotrichum fici*, *Geotrichum flavo-brunneum*, *Geotrichum fragrans*, *Geotrichum gracile*, *Geotrichum heritum*, *Geotrichum kiebaknii*, *Geotrichum penicillatum*, *Geotrichum hirtum*, *Geotrichum pseudocandidum*, *Geotrichum rectangulatum*, *Geotrichum suaveolens*, *Geotrichum vanrylae*, *Geotrichum loubieri*, *Geotrichum microsporum*, *Cladosporium* sp., *Trichoderma* sp., *Trichoderma hamatum*, *Trichoderma harzianum*, *Trichoderma koningii*, *Trichoderma pseudokoningii*, *Trichoderma reesei*, *Trichoderma virgatum*, *Trichoderma viride*, *Oidium* sp., *Alternaria* sp., *Alternaria alternata*, *Alternaria tenuis*, *Helminthosporium* sp., *Helminthosporium gramineum*, *Helminthosporium sativum*, *Helminthosporium teres*, *Aspergillus* sp., *Aspergillus ochraceus* Group, *Aspergillus nidulans* Group, *Aspergillus versicolor* Group, *Aspergillus wentii* Group, *Aspergillus candidus* Group, *Aspergillus flavus* Group, *Aspergillus niger* Group, *Penicillium* sp., *Penicillium aculeatum*, *Penicillium citrinum*, *Penicillium claviforme*, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium lanoso-viride*, *Penicillium emersonii*, *Penicillium lilacinum*, and *Penicillium expansum*.

30. The process for the preparation of malted cereal according to claim 27 wherein the bacteria are selected from the group comprising *Micrococcus* sp., *Streptococcus* sp., *Leuconostoc* sp., *Pediococcus* sp., *Lactococcus* sp., *Lactobacillus* sp., *Corynebacterium* sp., *Propionibacterium* sp., *Bifidobacterium* sp., *Streptomyces* sp., *Bacillus* sp., *Sporolactobacillus* sp., *Gluconobacter* sp., *Enterobacter* sp., *Erwinia* sp., *Klebsiella* sp., and *Proteus* sp.

31. A process for the preparation of malted cereal according to claim 27 wherein the fungi are selected from the group consisting of Ascomycota, Dothideales, Mycosphaerellaceae, *Mycosphaerella* sp., Venturiaceae, *Venturia* spp., Eurotiales, Monascaceae, *Monascus* sp., Trichocomaceae, *Emmericella* sp., *Eurotium* sp., *Eupenicillium* sp., *Neosartorya* sp., *Talaromyces* sp., Hypocreales, Hypocreaceae, *Hypocrea* sp., Saccharomycetales,

● Dipodascaceae, Dipodascus sap., Galactomyces sap., Endomycetaceae, Endomyces sap., Metschnikowiaceae, Guilliermondella sap., Saccharomycetaceae, Debaryomyces sap., Dekkera sap., Pichia sap., Klyveromyces sap., Sacchaaromyces sap., Torulaspora sap., Zygosaccharomyces sap., Sacchaaromycodaceae, Hansenlaspora sap., Schizosaccharomycetales, Schizosaccharomycetaceae, Schizosaccharomyces sap., Sordariales, Chaetomiaceae, Chaetomium sap., Sordariscese, Neurospora sap., Zygomycota, Mucorales, Mucoraceae, Absidia sap., Amylomyces sap., Rhizomucor sap., Actinomucor sap., Thermomucor sap., Chiamydomucor sap., Mucor sap., Rhizopus sap., Mitosporic fungi, Aureobasidium sap., Acremonium sap., Cerocospora sap., Epicoccum sap., Monilla sap., Mycoderma sap., Candida sap., Rhodotorula sap., Torulopsis sap., Geotrichum sap., Cladosporium sap., Trichoderma sap., Oidium sap., Alternara sap., Helminthosporium sap., Aspergillus sap., and Penicillium sap.

33. A process according to the claim 31, wherein the Rhizopus spp. is Rhizopus oryzae.

43. The process according to claim 1, wherein said activated spores increase an activity of an enzyme that is present in a cereal used during said malting process.

44. A process according to claim 27, 28, 29, 30 or 31, wherein the cereal is submersed in water to steep the cereal and a total time of submersion in the water during steeping does not exceed about 30 hours, and wherein the drying is at more than two temperatures and wherein the activated spores are from microbes selected from the group consisting of Rhizopus sap., Pseudomonas sap. and mixtures thereof.

45. A process according to claim 28, wherein the Pseudomonas sp. is Pseudomonas herbicola.

46. A process according to claim 27, wherein the activated spores are activated by treatments selected from the group consisting of cycles of wetting and/or drying, addition of nutritional supplies or addition of spore elements, exposure to temperature changes within a range of about 0° to about 80°C, and exposure to changes in pH within a pH range of about 2.0 to

- about 8.0 to obtain spores where the size of the spores is increased by a factor between about 1.2 and about 10 over their dormant size and/or the spores have one or more germ tubes per spore, and mixtures thereof.

47. A process according to claim 27, wherein the pH during the steeping step is adjusted to a value between about 4.0 and about 6.0.

48. A method for the preparation of a malted cereal product, the method comprising: mixing water, activated spores and a cereal to provide a malting cereal composition, the activated spores being present in the malting cereal composition in an amount of about 1×10^2 to about 1×10^7 per gram of air dry cereal, the amount of activated spores being effective for providing the malted cereal with the increased enzyme activity, the increased enzyme activity being greater than the enzyme activity which is obtained by the same malting process but with dormant spores.

49. The method as recited in claim 48, wherein said enzyme is selected from the group of β -glucanase, xylanase, amylase, protease, naturally occurring enzymes in the cereal and combinations thereof.

50. A method as recited in claim 49 wherein the activated spores are from the microbes selected from the group consisting of *Micrococcus* sap., *Streptococcus* sap., *Leuconostoc* sap., *Pediococcus* sap., *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus parvulus*, *Pediococcus soyae*, *Lactococcus* sap., *Lactobacillus* sap., *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bifermantans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus renterii*, *Lactobacillus sake*, *Lactobacillus sativorus*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus*

● confusus, *Lactobacillus florentinus*, *Lactobacillus viridescens*, *Corynebacterium* sap.,
Propionibacterium sap., *Bifidobacterium* sap., *Streptomyces* sap., *Bacillus* sap.,
Sporolactobacillus sap., *Acetobacter* sap., *Agrobacterium* sap., *Alcaligenes* sap., *Pseudomonas*
sap., *Pseudomonas amylophila*, *Pseudomonas aeruginosa*, *Pseudomonas cocovenenans*,
Pseudomonas mexicana, *Pseudomonas pseudomallei*, *Gluconobacter* sap., *Enterobacter* sap.,
Erwinia sap., *Klebsiella* sap., *Proteus* sap., Ascomycota, Dothideales, *Mycosphaerellaceae*,
Mycosphaerella sap., *Venturiaceae*, *Venturia* sap., Eurotiales, *Monascaceae*, *Monascus* sap.,
Trichocomaceae, *Emericilla* sap., *Euroteum* sap., *Eupenicillium* sap., *Neosartorya* sap.,
Talaromyces sap., Hypocreales, *Hypocreaceae*, *Hypocrea* sap., *Saccharomycetales*,
Dipodascaceae, *Dipodascus* sap., *Galactomyces* sap., *Endomycetaceae*, *Endomyces* sap.,
Metschnikowiaceae, *Guilliermondella* sap., *Saccharomycetaceae*, *Debaryomyces* sap., *Dekkera*
sap., *Pichia* sap., *Cluyveromyces* sap., *Saccharomyces* sap., *Torulaspora* sap.,
Zygosaccharomyces sap., *Saccharomycodaceae*, *Hanseniaspora* sap.; *Schizosaccharomycetales*,
Schizosaccharomycetaceae, *Schizosaccharomyces* sap., Sordariales, *Chaetomiaceae*,
Chaetomium sap., *Sordariaceae*, *Neurospora* sap., Zygomycota, *Mucorales*, *Mucoraceae*, *Absidia*
sap., *Amylomyces* sap., *Rhizomucor* sap., *Actinomucor* sap., *Thermomucor* sap.,
Chlamydomucor sap., *Mucor* sap., *Mucor circinelloides*, *Mucor grisecyanus*, *Mucor hiemalis*,
Mucor indicus, *Mucor mucedo*, *Mucor piriformis*, *Mucor plumbeus*, *Mucor praini*, *Mucor*
pusillus, *Mucor silvaticus*, *Mucor javanicus*, *Mucor racemosus*, *Mucor rouxianus*, *Mucor rouxii*,
Mucor aromaticus, *Mucor flavus*, *Mucor miehei*, *Rhizopus* sap., *Rhizopus arrhizus*, *Rhizopus*
oligosporus, *Rhizopus oryzae*, *Rhizopus oryzae* strain ATCC 4858, *Rhizopus oryzae* strain
ATCC 9363, *Rhizopus oryzae* strain NRRL 1891, *Rhizopus oryzae* strain NRRL 1472, *Rhizopus*
stolonifer, *Rhizopus thailandensis*, *Rhizopus formosaensis*, *Rhizopus chinensis*, *Rhizopus cohnii*,
Rhizopus japonicus, *Rhizopus nodosus*, *Rhizopus delemar*, *Rhizopus acetorinus*, *Rhizopus*
chlamydosporus, *Rhizopus circinans*, *Rhizopus javanicus*, *Rhizopus peka*, *Rhizopus saito*,
Rhizopus tritici, *Rhizopus niveus*, *Rhizopus microsporus*, *Mitosporic fungi*, *Aureobasidium* sap.,
Acremonium sap., *Cercospora* sap., *Epicoccum* sap., *Monilia* sap., *Monilia candida*, *Monilia*
sitophila, *Mycoderma* sap., *Candida* sap., *Candida diddensiae*, *Candida edax*, *Candida etchellsii*,
Candida kefir, *Candida krisei*, *Candida lactosa*, *Candida lambica*, *Candida melinii*, *Candida*
utilis, *Candida milleri*, *Candida mycoderma*, *Candida parapsilosis*, *Candida obtux*, *Candida*

● *tropicalis*, *Candida valida*, *Candida versatilis*, *Candida guilliermondii*, *Rhodotorula* sap., *Torulopsis* sap., *Geotrichum* sap., *Geotrichum amycelium*, *Geotrichum armillariae*, *Geotrichum asteroides*, *Geotrichum bipunctatum*, *Geotrichum dulcitum*, *Geotrichum ericense*, *Geotrichum fici*, *Geotrichum flavo-brunneum*, *Geotrichum fragrans*, *Geotrichum gracile*, *Geotrichum heritum*, *Geotrichum klebaknii*, *Geotrichum penicillatum*, *Geotrichum hirtum*, *Geotrichum pseudocandidum*, *Geotrichum rectangulatum*, *Geotrichum suaveolens*, *Geotrichum vanryiae*, *Geotrichum loubieri*, *Geotrichum microsporum*, *Cladosporium* sap., *Trichoderma* sap., *Trichoderma hamatum*, *Trichoderma harzianum*, *Trichoderma koningii*, *Trichoderma pseudokoningii*, *Trichoderma reesei*, *Trichoderma virgatum*, *Trichoderma viride*, *Oidium* sap., *Alternaria* sap., *Alternaria alternata*, *Alternaria tenuis*, *Helminthosporium* sap., *Helminthosporium gramineum*, *Helminthosporium sativum*, *Helminthosporium teres*, *Aspergillus* sap., *Aspergillus ochraseus*, *Aspergillus nidulans*, *Aspergillus versicolor*, *Aspergillus wentii* Group, *Aspergillus candidus*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus oryzae* strain ATCC 14156, *Penicillium* sap., *Penicillium aculeatum*, *Penicillium citrinum*, *Penicillium claviforme*, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium lanoso-viride*, *Penicillium emersonii*, *Penicillium lilacinum*, *Penicillium expansum* and mixtures thereof.

51. A method for the preparation of a malted cereal as recited in claims 48, 49 or 50 wherein the malting cereal composition is held with water at a temperature of from about 5°C to about 30°C for a time effective for providing a wetted cereal having a moisture content of at least about 20 weight percent.

52. A method for the preparation of a malted cereal as recited in claim 51 wherein the malting cereal composition is held for about 2 to about 7 days.

53. A method as recited in claim 52 wherein, the activated spores are activated by treatments selected from the group consisting of

- cycles of wetting and drying,
- addition of nutritional supplies,
- exposure to temperature changes within a range of about 0° to about 80°C,

● exposure to changes in pH within a pH range of about 2.0 to about 8.0 to obtain spores where the size of the spores is increased by a factor between about 1.2 and about 10 over their dormant size and/or the spores have one or more germ tubes per spore, and mixtures thereof.

54. A method as recited in claims 48, 49, or 50 wherein the cereal is barley.

55. A method as recited in claim 53 wherein the cereal is barley.

56. A method for the preparation of a malted cereal, the method comprising:
mixing water, activated spores and a cereal to provide a malting cereal composition, the activated spores being present in an amount of about 1×10^2 to about 1×10^7 per gram of air dry cereal to provide a malted cereal, the amount of activated spores being effective for providing the malted cereal with an increased enzyme activity, the increased enzyme activity being greater than the enzyme activity which is obtained by a malting process dormant spores.

57. A method as recited in claim 56 wherein the activated spores are from the microbes selected from the group consisting of *Micrococcus* sap., *Streptococcus* sap., *Leuconostoc* sap., *Pediococcus* sap., *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus parvulus*, *Pediococcus soya*, *Lactococcus* sap., *Lactobacillus* sap., *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bifementans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus renterii*, *Lactobacillus sake*, *Lactobacillus sativorus*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus confusus*, *Lactobacillus florentinus*, *Lactobacillus viridescens*, *Corynebacterium* sap., *Propionibacterium* sap., *Bifidobacterium* sap., *Streptomyces* sap., *Bacillus* sap., *Sporolactobacillus* sap., *Acetobacter* sap., *Agrobacterium* sap., *Alcaligenes* sap., *Pseudomonas* sap., *Pseudomonas amylophilia*, *Pseudomonas aeruginosa*, *Pseudomonas cocovenenans*,

- *Pseudomonas mexicana*, *Pseudomonas pseudomallei*, *Gluconobacter* sap., *Enterobacter* sap., *Erwinia* sap., *Klebsiella* sap., *Proteus* sap., Ascomycota, Dothideales, *Mycosphaerellaceae*, *Mycosphaerella* sap., *Venturiaceae*, *Venturia* sap., Eurotiales, *Monascaceae*, *Monascus* sap., *Trichocomaceae*, *Emericilla* sap., *Euroteum* sap., *Eupenicillium* sap., *Neosartorya* sap., *Talaromyces* sap., Hypocreales, *Hypocreaceae*, *Hypocrea* sap., *Saccharomycetales*, *Dipodascaceae*, *Dipodascus* sap., *Galactomyces* sap., *Endomycetaceae*, *Endomyces* sap., *Metschnikowiaceae*, *Guilliermondella* sap., *Saccharomycetaceae*, *Debaryomyces* sap., *Dekkera* sap., *Pichia* sap., *Kluyveromyces* sap., *Saccharomyces* sap., *Torulaspora* sap., *Zygosaccharomyces* sap., *Saccharomycodaceae*, *Hanseniaspora* sap.; *Schizosaccharomycetales*, *Schizosaccharomycetaceae*, *Schizosaccharomyces* sap., Sordariales, *Chaetomiaceae*, *Chaetomium* sap., *Sordariaceae*, *Neurospora* sap., Zygomycota, *Mucorales*, *Mucoraceae*, *Absidia* sap., *Amylomyces* sap., *Rhizomucor* sap., *Actinomucor* sap., *Thermomucor* sap., *Chlamydomucor* sap., *Mucor* sap., *Mucor circinelloides*, *Mucor grisecyanus*, *Mucor hiemalis*, *Mucor indicus*, *Mucor mucedo*, *Mucor piriformis*, *Mucor plumbeus*, *Mucor praini*, *Mucor pusillus*, *Mucor silvaticus*, *Mucor javanicus*, *Mucor racemosus*, *Mucor rouxianus*, *Mucor rouxii*, *Mucor aromaticus*, *Mucor flavus*, *Mucor miehei*, *Rhizopus* sap., *Rhizopus arrhizus*, *Rhizopus oligosporus*, *Rhizopus oryzae*, *Rhizopus oryzae* strain ATCC 4858, *Rhizopus oryzae* strain ATCC 9363, *Rhizopus oryzae* strain NRRL 1891, *Rhizopus oryzae* strain NRRL 1472, *Rhizopus stolonifer*, *Rhizopus thailandensis*, *Rhizopus formosaensis*, *Rhizopus chinensis*, *Rhizopus cohnii*, *Rhizopus japonicus*, *Rhizopus nodosus*, *Rhizopus delemar*, *Rhizopus acetorinus*, *Rhizopus chlamydosporus*, *Rhizopus circinans*, *Rhizopus javanicus*, *Rhizopus peka*, *Rhizopus saito*, *Rhizopus tritici*, *Rhizopus niveus*, *Rhizopus microsporus*, *Mitosporic fungi*, *Aureobasidium* sap., *Acremonium* sap., *Cercospora* sap., *Epicoccum* sap., *Monilia* sap., *Monilia candida*, *Monilia sitophila*, *Mycoderma* sap., *Candida* sap., *Candida diddensiae*, *Candida edax*, *Candida etchellsii*, *Candida kefir*, *Candida krisei*, *Candida lactosa*, *Candida lambica*, *Candida melinii*, *Candida utilis*, *Candida milleri*, *Candida mycoderma*, *Candida parapsilosis*, *Candida obtux*, *Candida tropicalis*, *Candida valida*, *Candida versatilis*, *Candida guilliermondii*, *Rhodotorula* sap., *Torulopsis* sap., *Geotrichum* sap., *Geotrichum amycelium*, *Geotrichum armillariae*, *Geotrichum asteroides*, *Geotrichum bipunctatum*, *Geotrichum dulcitum*, *Geotrichum erienne*, *Geotrichum fici*, *Geotrichum flavo-brunneum*, *Geotrichum fragrans*, *Geotrichum gracile*, *Geotrichum*

heritum, Geotrichum klebaknii, Geotrichum penicillatum, Geotrichum hirtum, Geotrichum pseudocandidum, Geotrichum rectangulatum, Geotrichum suaveolens, Geotrichum vanryiae, Geotrichum loubieri, Geotrichum microsporum, Cladosporium sap., Trichoderma sap., Trichoderma hamatum, Trichoderma harzianum, Trichoderma koningii, Trichoderma pseudokoningii, Trichoderma reesei, Trichoderma virgatum, Trichoderma viride, Oidium sap., Alternaria sap., Alternaria alternata, Alternaria tenuis, Helminthosporium sap., Helminthosporium gramineum, Helminthosporium sativum, Helminthosporium teres, Aspergillus sap., Aspergillus ochraseus, Aspergillus nidulans, Aspergillus versicolor, Aspergillus wentii Group, Aspergillus candidus, Aspergillus flavus, Aspergillus niger, Aspergillus oryzae strain ATCC 14156, Penicillium sap., Penicillium aculeatum, Penicillium citrinum, Penicillium claviforme, Penicillium funiculosum, Penicillium italicum, Penicillium lanoso-viride, Penicillium emersonii, Penicillium lilacinum, Penicillium expansum and mixtures thereof.

58. A method as recited in claim 56, wherein the activated spores increase an activity of an enzyme that is present in the malting cereal composition, said enzyme selected from the group of β -glucanase, xylanase, amylase, protease, naturally occurring enzymes in the cereal and combinations thereof.

59. A method for the preparation of a malted cereal as recited in claims 57 or 58 wherein the malting cereal composition is held with water at a temperature of from about 5°C to about 30°C for a time effective for providing a wetted cereal having a moisture content of at least about 20 weight percent.

60. A method for the preparation of a malted cereal as recited in claim 59 wherein the malting cereal composition is held with water for about 2 to about 7 days.

61. A method as recited in claim 60 wherein the activated spores are activated by treatments selected from the group consisting of
cycles of wetting and drying,
addition of nutritional supplies,

● exposure to temperature changes within a range of about 0° to about 80°C,
exposure to changes in pH within a pH range of about 2.0 to about 8.0 to obtain spores where the size of the spores is increased by a factor between about 1.2 and about 10 over their dormant size and/or the spores have one or more germ tubes per spore, and mixtures thereof.

62. A method for the preparation of a malted cereal as recited in claim 61, wherein the activated spores are being present in an amount of from about 1×10^2 to about 1×10^7 per gram of air dry cereal.

63. A method for preparation of a malted cereal as recited in claim 59 wherein the cereal is barley.

64. A method for the preparation of a malted barley, the method comprising:
mixing activated spores, a barley and water to provide a malting barley composition, the activated spores being present in an amount of about 1×10^2 to about 1×10^7 per gram of air dry barley to provide a malting barley composition, the amount of activated spores being effective for providing an increased enzyme activity greater than the enzyme activity which is obtained by the same malting process which includes dormant spores and wherein the increased enzyme activity is selected from the group of β -glucanase, xylanase, amylase, Protease, naturally occurring enzymes in the barley and combinations thereof;

holding the malting barley composition at a temperature of from about 5°C to about 30°C for a time effective for providing a wetted barley having a moisture content of at least about 20 weight percent, and

wherein the activated spores are activated by treatments selected from the group consisting of

cycles of wetting and drying,

addition of nutritional supplies,

exposure to temperature changes within a range of about 0° to about 80°C,

exposure to changes in pH within a pH range of about 2.0 to about 8.0 to obtain spores where the size of the spores is increased by a factor between about 1.2 and about 10 over their dormant

size and/or the spores have one or more germ tubes per spore, and mixtures thereof.

65. A method for the preparation of a malted cereal as recited in claim 64 wherein, the malting barley composition is held with water for about 2 to about 7 days to provide a malted barley with a moisture content of from about 20 weight percent to about to about 60 weight percent.

66. A method for the preparation of a malted barley as recited in claim 64, wherein the activated spores are from the microbes selected from the group consisting of *Micrococcus* sap., *Streptococcus* sap., *Leuconostoc* sap., *Pediococcus* sap., *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus parvulus*, *Pediococcus soyae*, *Lactococcus* sap., *Lactobacillus* sap., *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bifermantans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus renterii*, *Lactobacillus sake*, *Lactobacillus sativorius*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus confusus*, *Lactobacillus florentinus*, *Lactobacillus viridescens*, *Corynebacterium* sap., *Propionibacterium* sap., *Bifidobacterium* sap., *Streptomyces* sap., *Bacillus* sap., *Sporolactobacillus* sap., *Acetobacter* sap., *Agrobacterium* sap., *Alcaligenes* sap., *Pseudomonas* sap., *Pseudomonas amylophilia*, *Pseudomonas aeruginosa*, *Pseudomonas cocovenenans*, *Pseudomonas mexicana*, *Pseudomonas pseudomallei*, *Gluconobacter* sap., *Enterobacter* sap., *Erwinia* sap., *Klebsiella* sap., *Proteus* sap., *Ascomycota*, *Dothideales*, *Mycosphaerellaceae*, *Mycosphaerella* sap., *Venturiaceae*, *Venturia* sap., *Eurotiales*, *Monascaceae*, *Monascus* sap., *Trichocomaceae*, *Emericilla* sap., *Euroteum* sap., *Eupenicillium* sap., *Neosartorya* sap., *Talaromyces* sap., *Hypocreales*, *Hypocreaceae*, *Hypocrea* sap., *Saccharomycetales*, *Dipodascaceae*, *Dipodascus* sap., *Galactomyces* sap., *Endomycetaceae*, *Endomyces* sap., *Metschnikowiaceae*, *Guilliermondella* sap., *Saccharomycetaceae*, *Debaryomyces* sap., *Dekkera* sap., *Pichia* sap., *Kluyveromyces* sap., *Saccharomyces* sap.,

● *Torulaspora* sap., *Zygosaccharomyces* sap., *Saccharomycodaceae*, *Hanseniaspora* sap.;
Schizosaccharomycetales, *Schizosaccharomycetaceae*, *Schizosaccharomyces* sap., *Sordariales*,
Chaetomiaceae, *Chaetomium* sap., *Sordariaceae*, *Neurospora* sap., *Zygomycota*, *Mucorales*,
Mucoraceae, *Absidia* sap., *Amylomyces* sap., *Rhizomucor* sap., *Actinomucor* sap., *Thermomucor*
sap., *Chlamydomucor* sap., *Mucor* sap., *Mucor circinelloides*, *Mucor grisecyanus*, *Mucor*
hiemalis, *Mucor indicus*, *Mucor mucedo*, *Mucor piriformis*, *Mucor plumbeus*, *Mucor praini*,
Mucor pusillus, *Mucor silvaticus*, *Mucor javanicus*, *Mucor racemosus*, *Mucor rouxianus*, *Mucor*
rouxii, *Mucor aromaticus*, *Mucor flavus*, *Mucor miehei*, *Rhizopus* sap., *Rhizopus arrhizus*,
Rhizopus oligosporus, *Rhizopus oryzae*, *Rhizopus oryzae* strain ATCC 4858, *Rhizopus oryzae*
 strain ATCC 9363, *Rhizopus oryzae* strain NRRL 1891, *Rhizopus oryzae* strain NRRL 1472,
Rhizopus stolonifer, *Rhizopus thailandensis*, *Rhizopus formosaensis*, *Rhizopus chinensis*,
Rhizopus cohnii, *Rhizopus japonicus*, *Rhizopus nodosus*, *Rhizopus delemar*, *Rhizopus*
acetoninus, *Rhizopus chlamydosporus*, *Rhizopus circinans*, *Rhizopus javanicus*, *Rhizopus peka*,
Rhizopus saito, *Rhizopus tritici*, *Rhizopus niveus*, *Rhizopus microsporus*, *Mitosporic fungi*,
Aureobasidium sap., *Acremonium* sap., *Cercospora* sap., *Epicoccum* sap., *Monilia* sap., *Monilia*
candida, *Monilia sitophila*, *Mycoderma* sap., *Candida* sap., *Candida diddensiae*, *Candida edax*,
Candida etchellsii, *Candida kefir*, *Candida krisei*, *Candida lactosa*, *Candida lambica*, *Candida*
melinii, *Candida utilis*, *Candida milleri*, *Candida mycoderma*, *Candida parapsilosis*, *Candida*
obtus, *Candida tropicalis*, *Candida valida*, *Candida versatilis*, *Candida guilliermondii*,
Rhodotorula sap., *Torulopsis* sap., *Geotrichum* sap., *Geotrichum amycelium*, *Geotrichum*
armillariae, *Geotrichum asteroides*, *Geotrichum bipunctatum*, *Geotrichum dulcitum*, *Geotrichum*
eriense, *Geotrichum fici*, *Geotrichum flavo-brunneum*, *Geotrichum fragrans*, *Geotrichum gracile*,
Geotrichum heritum, *Geotrichum klebaknii*, *Geotrichum penicillatum*, *Geotrichum hirtum*,
Geotrichum pseudocandidum, *Geotrichum rectangulatum*, *Geotrichum suaveolens*, *Geotrichum*
vanryiae, *Geotrichum loubieri*, *Geotrichum microsporum*, *Cladosporium* sap., *Trichoderma* sap.,
Trichoderma hamatum, *Trichoderma harzianum*, *Trichoderma koningii*, *Trichoderma*
pseudokoningii, *Trichoderma reesei*, *Trichoderma virgatum*, *Trichoderma viride*, *Oidium* sap.,
Alternaria sap., *Alternaria alternata*, *Alternaria tenuis*, *Helminthosporium* sap.,
Helminthosporium gramineum, *Helminthosporium sativum*, *Helminthosporium teres*,
Aspergillus sap., *Aspergillus ochraseus*, *Aspergillus nidulans*, *Aspergillus versicolor*, *Aspergillus*

wentii Group, *Aspergillus candidus*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus oryzae* strain ATCC 14156, *Penicillium sap.*, *Penicillium aculeatum*, *Penicillium citrinum*, *Penicillium claviforme*, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium lanoso-viride*, *Penicillium emersonii*, *Penicillium lilacinum*, *Penicillium expansum* and mixtures thereof.

67. A method for the preparation of a malted barley, the method comprising:

mixing activated spores, a barley and water to provide a malting barley composition, the activated spores being present in an amount of about 1×10^2 to about 1×10^7 per gram of air dry barley to provide a malting barley composition, the amount of activated spores being effective for providing an increased enzyme activity greater than the enzyme activity which is obtained by the same malting process which includes dormant spores and wherein the increased enzyme activity is selected from the group of β -glucanase, xylanase, amylase, Protease, naturally occurring enzymes in the barley and combinations thereof;

holding the malting barley composition at a temperature of from about 5°C to about 30°C for a time effective for providing a wetted barley having a moisture content of at least about 20 weight percent; and

germinating the wetted barley in the presence of the activated spores for about 2 to about 7 days at a temperature between about 10° to about 30°C, to provide malted barely with the increased enzyme activity.

68. A method as recited in claim 67 wherein the combination is held until the barley germinates and after germination, barley is dried to a moisture content of not more than about 15 weight percent.

69. A method as recited in claim 67 wherein the method further comprises drying the combination and prior to the drying, the combination is held until the cereal has a moisture content of between about 20 to about 60 weight percent and the barley has germinated for about 2 to about 7 days at a temperature of from about 10 to about 30°C.

70. A method as recited in claim 67 wherein the process further comprises drying the

● combination and prior to drying, the combination is held until the cereal has a moisture content of between about 20 to about 60 weight percent and the cereal has germinated for about 2 to about 7 days at a temperature of from about 10 to about 30°C.; and

after the germination, the combination is dried to a moisture content of from about 2 to about 15 weight percent.

71. A method as recited in claim 67 wherein the activated spores are from the microbes selected from the group consisting of *Micrococcus* sap., *Streptococcus* sap., *Leuconostoc* sap., *Pediococcus* sap., *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus parvulus*, *Pediococcus soyae*, *Lactococcus* sap., *Lactobacillus* sap., *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bifementans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus renterii*, *Lactobacillus sake*, *Lactobacillus sativorus*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus confusus*, *Lactobacillus florentinus*, *Lactobacillus viridescens*, *Corynebacterium* sap., *Propionibacterium* sap., *Bifidobacterium* sap., *Streptomyces* sap., *Bacillus* sap., *Sporolactobacillus* sap., *Acetobacter* sap., *Agrobacterium* sap., *Alcaligenes* sap., *Pseudomonas* sap., *Pseudomonas amylophilia*, *Pseudomonas aeruginosa*, *Pseudomonas cocovenenans*, *Pseudomonas mexicana*, *Pseudomonas pseudomallei*, *Gluconobacter* sap., *Enterobacter* sap., *Erwinia* sap., *Klebsiella* sap., *Proteus* sap., *Ascomycota*, *Dothideales*, *Mycosphaerellaceae*, *Mycosphaerella* sap., *Venturiaceae*, *Venturia* sap., *Eurotiales*, *Monascaceae*, *Monascus* sap., *Trichocomaceae*, *Emericilla* sap., *Euroteum* sap., *Eupenicillium* sap., *Neosartorya* sap., *Talaromyces* sap., *Hypocreales*, *Hypocreaceae*, *Hypocrea* sap., *Saccharomycetales*, *Dipodascaceae*, *Dipodascus* sap., *Galactomyces* sap., *Endomycetaceae*, *Endomyces* sap., *Metschnikowiaceae*, *Guilliermondella* sap., *Saccharomycetaceae*, *Debaryomyces* sap., *Dekkera* sap., *Pichia* sap., *Kluyveromyces* sap., *Saccharomyces* sap., *Torulaspora* sap., *Zygosaccharomyces* sap., *Saccharomycodaceae*, *Hanseniaspora* sap.; *Schizosaccharomycetales*,

- Schizosaccharomycetaceae, Schizosaccharomyces sap., Sordariales, Chaetomiaceae, Chaetomium sap., Sordariaceae, Neurospora sap., Zygomycota, Mucorales, Mucoraceae, Absidia sap., Amylomyces sap., Rhizomucor sap., Actinomucor sap., Thermomucor sap., Chlamydomucor sap., Mucor sap., Mucor circinelloides, Mucor grisecyanus, Mucor hiemalis, Mucor indicus, Mucor mucedo, Mucor piriformis, Mucor plumbeus, Mucor praini, Mucor pusillus, Mucor silvaticus, Mucor javanicus, Mucor racemosus, Mucor rouxianus, Mucor rouxii, Mucor aromaticus, Mucor flavus, Mucor miehei, Rhizopus sap., Rhizopus arrhizus, Rhizopus oligosporus, Rhizopus oryzae, Rhizopus oryzae strain ATCC 4858, Rhizopus oryzae strain ATCC 9363, Rhizopus oryzae strain NRRL 1891, Rhizopus oryzae strain NRRL 1472, Rhizopus stolonifer, Rhizopus thailandensis, Rhizopus formosaensis, Rhizopus chinensis, Rhizopus cohnii, Rhizopus japonicus, Rhizopus nodosus, Rhizopus delemar, Rhizopus acetorinus, Rhizopus chlamydosporus, Rhizopus circinans, Rhizopus javanicus, Rhizopus peka, Rhizopus saito, Rhizopus tritici, Rhizopus niveus, Rhizopus microsporus, Mitosporic fungi, Aureobasidium sap., Acremonium sap., Cercospora sap., Epicoccum sap., Monilia sap., Monilia candida, Monilia sitophila, Mycoderma sap., Candida sap., Candida diddensiae, Candida edax, Candida etchellsii, Candida kefir, Candida krisei, Candida lactosa, Candida lambica, Candida melinii, Candida utilis, Candida milleri, Candida mycoderma, Candida parapsilosis, Candida obtux, Candida tropicalis, Candida valida, Candida versatilis, Candida guilliermondii, Rhodotorula sap., Torulopsis sap., Geotrichum sap., Geotrichum amycelium, Geotrichum armillariae, Geotrichum asteroides, Geotrichum bipunctatum, Geotrichum dulcitum, Geotrichum erienne, Geotrichum fici, Geotrichum flavo-brunneum, Geotrichum fragrans, Geotrichum gracile, Geotrichum heritum, Geotrichum klebaknii, Geotrichum penicillatum, Geotrichum hirtum, Geotrichum pseudocandidum, Geotrichum rectangulatum, Geotrichum suaveolens, Geotrichum vanryiae, Geotrichum loubieri, Geotrichum microsporum, Cladosporium sap., Trichoderma sap., Trichoderma hamatum, Trichoderma harzianum, Trichoderma koningii, Trichoderma pseudokoningii, Trichoderma reesei, Trichoderma virgatum, Trichoderma viride, Oidium sap., Alternaria sap., Alternaria alternata, Alternaria tenuis, Helminthosporium sap., Helminthosporium gramineum, Helminthosporium sativum, Helminthosporium teres, Aspergillus sap., Aspergillus ochraceus, Aspergillus nidulans, Aspergillus versicolor, Aspergillus wentii Group, Aspergillus candidus, Aspergillus flavus, Aspergillus niger, Aspergillus oryzae

● strain ATCC 14156, *Penicillium* sap., *Penicillium aculeatum*, *Penicillium citrinum*, *Penicillium claviforme*, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium lanoso-viride*, *Penicillium emersonii*, *Penicillium lilacinum*, *Penicillium expansum* and mixtures thereof.

72. A method for the preparation of a malted cereal product, the method comprising: mixing water, activated spores and a cereal to provide a malting cereal composition, the activated spores being present in the malting cereal composition in an amount of at least about 1×10^2 per gram of air dry cereal, the amount of activated spores being effective for providing the malted cereal with the increased enzyme activity, the increased enzyme activity being greater than the enzyme activity which is obtained by the same malting process with dormant spores.

73. A method as recited in Claim 72, wherein said enzyme is selected from the group of B-glucanase, xylanase, amylase, a protease, naturally occurring enzymes in the cereal and combinations thereof.

74. A method as recited in claim 72 wherein the combination is held for a time and temperature until the cereal has a moisture content of at least about 20 weight percent.

75. A method as recited in claim 72, wherein the combination is held until the cereal germinates and after germination, cereal is dried to a moisture content of not more than about 15 weight percent.

76. A method as recited in claim 72 wherein the process further comprises drying the combination and prior to the drying, the combination is held until the cereal has a moisture content of between about 20 to about 60 weight percent and the cereal has germinated for about 2 to about 7 days at a temperature of from about 10 to about 30°C.

77. A method as recited in claim 72 wherein the process further comprises drying the combination and prior to drying, the combination is held until the cereal has a moisture content of between about 20 to about 60 weight percent and the cereal has germinated for about 2 to

● about 7 days at a temperature of from about 10 to about 30°C.; and

after the germination, the combination is dried to a moisture content of from about 2 to about 15 weight percent.

78. A method as recited in claim 72 wherein the activated spores are from the microbes selected from the group consisting of *Micrococcus* sap., *Streptococcus* sap., *Leuconostoc* sap., *Pediococcus* sap., *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus parvulus*, *Pediococcus soyae*, *Lactococcus* sap., *Lactobacillus* sap., *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bifermantans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus renterii*, *Lactobacillus sake*, *Lactobacillus sativorus*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus confusus*, *Lactobacillus florentinus*, *Lactobacillus viridescens*, *Corynebacterium* sap., *Propionibacterium* sap., *Bifidobacterium* sap., *Streptomyces* sap., *Bacillus* sap., *Sporolactobacillus* sap., *Acetobacter* sap., *Agrobacterium* sap., *Alcaligenes* sap., *Pseudomonas* sap., *Pseudomonas amylophilia*, *Pseudomonas aeruginosa*, *Pseudomonas cocovenenans*, *Pseudomonas mexicana*, *Pseudomonas pseudomallei*, *Gluconobacter* sap., *Enterobacter* sap., *Erwinia* sap., *Klebsiella* sap., *Proteus* sap., *Ascomycota*, *Dothideales*, *Mycosphaerellaceae*, *Mycosphaerella* sap., *Venturiaceae*, *Venturia* sap., *Eurotiales*, *Monascaceae*, *Monascus* sap., *Trichocomaceae*, *Emericilla* sap., *Euroteum* sap., *Eupenicillium* sap., *Neosartorya* sap., *Talaromyces* sap., *Hypocreales*, *Hypocreaceae*, *Hypocrea* sap., *Saccharomycetales*, *Dipodascaceae*, *Dipodascus* sap., *Galactomyces* sap., *Endomycetaceae*, *Endomyces* sap., *Metschnikowiaceae*, *Guilliermondella* sap., *Saccharomycetaceae*, *Debaryomyces* sap., *Dekkera* sap., *Pichia* sap., *Kluyveromyces* sap., *Saccharomyces* sap., *Torulaspora* sap., *Zygosaccharomyces* sap., *Saccharomycodaceae*, *Hanseniaspora* sap.; *Schizosaccharomycetales*, *Schizosaccharomycetaceae*, *Schizosaccharomyces* sap., *Sordariales*, *Chaetomiaceae*, *Chaetomium* sap., *Sordariaceae*, *Neurospora* sap., *Zygomycota*, *Mucorales*, *Mucoraceae*, *Absidia*

● sap., *Amylomyces* sap., *Rhizomucor* sap., *Actinomucor* sap., *Thermomucor* sap.,
Chlamydomucor sap., *Mucor* sap., *Mucor circinelloides*, *Mucor grisecyanus*, *Mucor hiemalis*,
Mucor indicus, *Mucor mucedo*, *Mucor piriformis*, *Mucor plumbeus*, *Mucor praini*, *Mucor*
pusillus, *Mucor silvaticus*, *Mucor javanicus*, *Mucor racemosus*, *Mucor rouxianus*, *Mucor rouxii*,
Mucor aromaticus, *Mucor flavus*, *Mucor miehei*, *Rhizopus* sap., *Rhizopus arrhizus*, *Rhizopus*
oligosporus, *Rhizopus oryzae*, *Rhizopus oryzae* strain ATCC 4858, *Rhizopus oryzae* strain
 ATCC 9363, *Rhizopus oryzae* strain NRRL 1891, *Rhizopus oryzae* strain NRRL 1472, *Rhizopus*
stolonifer, *Rhizopus thailandensis*, *Rhizopus formosaensis*, *Rhizopus chinensis*, *Rhizopus cohnii*,
Rhizopus japonicus, *Rhizopus nodosus*, *Rhizopus delemar*, *Rhizopus acetorinus*, *Rhizopus*
chlamydosporus, *Rhizopus circinans*, *Rhizopus javanicus*, *Rhizopus peka*, *Rhizopus saito*,
Rhizopus tritici, *Rhizopus niveus*, *Rhizopus microsporus*, *Mitosporic fungi*, *Aureobasidium* sap.,
Acremonium sap., *Cercospora* sap., *Epicoccum* sap., *Monilia* sap., *Monilia candida*, *Monilia*
sitophila, *Mycoderma* sap., *Candida* sap., *Candida diddensiae*, *Candida edax*, *Candida etchellsii*,
Candida kefir, *Candida krisei*, *Candida lactosa*, *Candida lambica*, *Candida melinii*, *Candida*
utilis, *Candida milleri*, *Candida mycoderma*, *Candida parapsilosis*, *Candida obtux*, *Candida*
tropicalis, *Candida valida*, *Candida versatilis*, *Candida guilliermondii*, *Rhodotorula* sap.,
Torulopsis sap., *Geotrichum* sap., *Geotrichum amycelium*, *Geotrichum armillariae*, *Geotrichum*
asteroides, *Geotrichum bipunctatum*, *Geotrichum dulcitum*, *Geotrichum erienne*, *Geotrichum*
fici, *Geotrichum flavo-brunneum*, *Geotrichum fragrans*, *Geotrichum gracile*, *Geotrichum*
heritum, *Geotrichum klebaknii*, *Geotrichum penicillatum*, *Geotrichum hirtum*, *Geotrichum*
pseudocandidum, *Geotrichum rectangulatum*, *Geotrichum suaveolens*, *Geotrichum vanryiae*,
Geotrichum loubieri, *Geotrichum microsporum*, *Cladosporium* sap., *Trichoderma* sap.,
Trichoderma hamatum, *Trichoderma harzianum*, *Trichoderma koningii*, *Trichoderma*
pseudokoningii, *Trichoderma reesei*, *Trichoderma virgatum*, *Trichoderma viride*, *Oidium* sap.,
Alternaria sap., *Alternaria alternata*, *Alternaria tenuis*, *Helminthosporium* sap.,
Helminthosporium gramineum, *Helminthosporium sativum*, *Helminthosporium teres*,
Aspergillus sap., *Aspergillus ochraseus*, *Aspergillus nidulans*, *Aspergillus versicolor*, *Aspergillus*
wentii Group, *Aspergillus candidus*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus oryzae*
 strain ATCC 14156, *Penicillium* sap., *Penicillium aculeatum*, *Penicillium citrinum*, *Penicillium*
claviforme, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium lanoso-viride*, *Penicillium*

● emersonii, *Penicillium lilacinum*, *Penicillium expansum* and mixtures thereof.

79. A method for the preparation of a malted barley, the method comprising:

mixing activated spores, a barley and water to provide a malting barley composition, the activated spores being present in an amount of at least about 1×10^7 per gram of air dry barley to provide a malting barley composition, the amount of activated spores being effective for providing an increased enzyme activity greater than the enzyme activity which is obtained by the same malting process which includes dormant spores and wherein the increased enzyme activity is selected from the group of β -glucanase, xylanase, amylase, Protease, naturally occurring enzymes in the barley and combinations thereof;

holding the malting barley composition at a temperature of from about 5°C to about 30°C for a time effective for providing a wetted barley having a moisture content of at least about 20 weight percent; and

germinating the wetted barley in the presence of the activated spores for about 2 to about 7 days at a temperature between about 10° to about 30°C, to provide malted barely with the increased enzyme activity.

80. A method as recited in claim 79 wherein the combination is held until the barley germinates and after germination, barley is dried to a moisture content of not more than about 15 weight percent.

81. A method as recited in claim 79 wherein the process further comprises drying the combination and prior to the drying, the combination is held until the barely has a moisture content of between about 20 to about 60 weight percent and the barely has germinated for about 2 to about 7 days at a temperature of from about 10 to about 30°C.

82. A method as recited in claim 79 wherein the process further comprises drying the combination and prior to drying, the combination is held until the barley has a moisture content of between about 20 to about 60 weight percent and the barely has germinated for about 2 to about 7 days at a temperature of from about 10 to about 30°C.; and

after the germination, the combination is dried to a moisture content of from about 2 to about 15 weight percent.

83. A method as recited in claim 79 wherein the activated spores are from the microbes selected from the group consisting of *Micrococcus* sap., *Streptococcus* sap., *Leuconostoc* sap., *Pediococcus* sap., *Pediococcus halophilus*, *Pediococcus cerevisiae*, *Pediococcus damnosus*, *Pediococcus hemophilus*, *Pediococcus parvulus*, *Pediococcus soyae*, *Lactococcus* sap., *Lactobacillus* sap., *Lactobacillus acidophilus*, *Lactobacillus amylovorus*, *Lactobacillus bavaricus*, *Lactobacillus bifermantans*, *Lactobacillus brevis* var *lindneri*, *Lactobacillus casei* var *casei*, *Lactobacillus delbrueckii*, *Lactobacillus delbrueckii* var *lactis*, *Lactobacillus delbrueckii* var *bulgaricus*, *Lactobacillus fermenti*, *Lactobacillus gasserii*, *Lactobacillus helveticus*, *Lactobacillus hilgardii*, *Lactobacillus renterii*, *Lactobacillus sake*, *Lactobacillus sativorus*, *Lactobacillus cremoris*, *Lactobacillus kefir*, *Lactobacillus pentoceticus*, *Lactobacillus cellobiosus*, *Lactobacillus bruxellensis*, *Lactobacillus buchnerii*, *Lactobacillus coryneformis*, *Lactobacillus confusus*, *Lactobacillus florentinus*, *Lactobacillus viridescens*, *Corynebacterium* sap., *Propionibacterium* sap., *Bifidobacterium* sap., *Streptomyces* sap., *Bacillus* sap., *Sporolactobacillus* sap., *Acetobacter* sap., *Agrobacterium* sap., *Alcaligenes* sap., *Pseudomonas* sap., *Pseudomonas amylophilia*, *Pseudomonas aeruginosa*, *Pseudomonas cocovenenans*, *Pseudomonas mexicana*, *Pseudomonas pseudomallei*, *Gluconobacter* sap., *Enterobacter* sap., *Erwinia* sap., *Klebsiella* sap., *Proteus* sap., *Ascomycota*, *Dothideales*, *Mycosphaerellaceae*, *Mycosphaerella* sap., *Venturiaceae*, *Venturia* sap., *Eurotiales*, *Monascaceae*, *Monascus* sap., *Trichocomaceae*, *Emericella* sap., *Eurotium* sap., *Eupenicillium* sap., *Neosartorya* sap., *Talaromyces* sap., *Hypocreales*, *Hypocreaceae*, *Hypocrea* sap., *Saccharomycetales*, *Dipodascaceae*, *Dipodascus* sap., *Galactomyces* sap., *Endomycetaceae*, *Endomyces* sap., *Metschnikowiaceae*, *Guilliermondella* sap., *Saccharomycetaceae*, *Debaryomyces* sap., *Dekkera* sap., *Pichia* sap., *Kluyveromyces* sap., *Saccharomyces* sap., *Torulaspora* sap., *Zygosaccharomyces* sap., *Saccharomycodaceae*, *Hanseniaspora* sap.; *Schizosaccharomycetales*, *Schizosaccharomycetaceae*, *Schizosaccharomyces* sap., *Sordariales*, *Chaetomiaceae*, *Chaetomium* sap., *Sordariaceae*, *Neurospora* sap., *Zygomycota*, *Mucorales*, *Mucoraceae*, *Absidia* sap., *Amylomyces* sap., *Rhizomucor* sap., *Actinomucor* sap., *Thermomucor* sap.,

Chlamydomucor sap., *Mucor* sap., *Mucor circinelloides*, *Mucor grisecyanus*, *Mucor hiemalis*,
Mucor indicus, *Mucor mucedo*, *Mucor piriformis*, *Mucor plumbeus*, *Mucor praini*, *Mucor*
pusillus, *Mucor silvaticus*, *Mucor javanicus*, *Mucor racemosus*, *Mucor rouxianus*, *Mucor rouxii*,
Mucor aromaticus, *Mucor flavus*, *Mucor miehei*, *Rhizopus* sap., *Rhizopus arrhizus*, *Rhizopus*
oligosporus, *Rhizopus oryzae*, *Rhizopus oryzae* strain ATCC 4858, *Rhizopus oryzae* strain
ATCC 9363, *Rhizopus oryzae* strain NRRL 1891, *Rhizopus oryzae* strain NRRL 1472, *Rhizopus*
stolonifer, *Rhizopus thailandensis*, *Rhizopus formosaensis*, *Rhizopus chinensis*, *Rhizopus cohnii*,
Rhizopus japonicus, *Rhizopus nodosus*, *Rhizopus delemar*, *Rhizopus acetorinus*, *Rhizopus*
chlamydosporus, *Rhizopus circinans*, *Rhizopus javanicus*, *Rhizopus peka*, *Rhizopus saito*,
Rhizopus tritici, *Rhizopus niveus*, *Rhizopus microsporus*, *Mitosporic* fungi, *Aureobasidium* sap.,
Acremonium sap., *Cercospora* sap., *Epicoccum* sap., *Monilia* sap., *Monilia candida*, *Monilia*
sitophila, *Mycoderma* sap., *Candida* sap., *Candida diddensiae*, *Candida edax*, *Candida etchellsii*,
Candida kefir, *Candida krisei*, *Candida lactosa*, *Candida lambica*, *Candida melinii*, *Candida*
utilis, *Candida milleri*, *Candida mycoderma*, *Candida parapsilosis*, *Candida obtux*, *Candida*
tropicalis, *Candida valida*, *Candida versatilis*, *Candida guilliermondii*, *Rhodotorula* sap.,
Torulopsis sap., *Geotrichum* sap., *Geotrichum amycelium*, *Geotrichum armillariae*, *Geotrichum*
asteroides, *Geotrichum bipunctatum*, *Geotrichum dulcitum*, *Geotrichum erienne*, *Geotrichum*
fici, *Geotrichum flavo-brunneum*, *Geotrichum fragrans*, *Geotrichum gracile*, *Geotrichum*
heritum, *Geotrichum klebaknii*, *Geotrichum penicillatum*, *Geotrichum hirtum*, *Geotrichum*
pseudocandidum, *Geotrichum rectangulatum*, *Geotrichum suaveolens*, *Geotrichum vanryiae*,
Geotrichum loubieri, *Geotrichum microsporum*, *Cladosporium* sap., *Trichoderma* sap.,
Trichoderma hamatum, *Trichoderma harzianum*, *Trichoderma koningii*, *Trichoderma*
pseudokoningii, *Trichoderma reesei*, *Trichoderma virgatum*, *Trichoderma viride*, *Oidium* sap.,
Alternaria sap., *Alternaria alternata*, *Alternaria tenuis*, *Helminthosporium* sap.,
Helminthosporium gramineum, *Helminthosporium sativum*, *Helminthosporium teres*,
Aspergillus sap., *Aspergillus ochraseus*, *Aspergillus nidulans*, *Aspergillus versicolor*, *Aspergillus*
wentii Group, *Aspergillus candidus*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus oryzae*
strain ATCC 14156, *Penicillium* sap., *Penicillium aculeatum*, *Penicillium citrinum*, *Penicillium*
claviforme, *Penicillium funiculosum*, *Penicillium italicum*, *Penicillium lanoso-viride*, *Penicillium*
emersonii, *Penicillium lilacinum*, *Penicillium expansum* and mixtures thereof.